Amendment to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A microfluidic device, comprising:

a body structure having a microscale cavity disposed therein; and

a set of particles disposed within the microscale cavity, wherein the particles comprise beads, wherein said sets of particles is flowable, and wherein the microscale cavity comprises a first microchannel comprising at least one reagent flow region and at least one particle capture region, wherein the at least one particle capture region has an increased depth relative to the at least one reagent flow region.

2. (currently amended) The ~~microfludic~~microfluidic device of claim 1, wherein the beads in the set of particles are coupled to reagents.

3. (previously presented) The microfluidic device of claim 2, wherein the reagents are nucleic acids.

4. (previously presented) The microfluidic device of claim 2, wherein the reagents are proteins.

5. (previously presented) The microfluidic device of claim 3, wherein the reagents are DNA probes.

6. (previously presented) The microfluidic device of claim 2, wherein the beads in the set of particles are chemically coated microspheres.

7. (previously presented) The microfluidic device of claim 3, wherein the beads in the set of particles are DNA coated microspheres.

8. (previously presented) The microfluidic device of claim 1, wherein the size of the beads ranges from about 0.1 microns to about 50 microns.

9. (previously presented) The microfluidic device of claim 1, wherein the depth of the reagent flow region is sufficiently small to inhibit the movement of particles in the set of particles.

10. (previously presented) The microfluidic device of claim 7, wherein the depth of the reagent flow region is less than about 10 microns.

11. (previously presented) The microfluidic device of claim 8, wherein the depth of the reagent flow region is less than about 5 microns.

12. (withdrawn) A method of carrying out a chemical reaction in a microfluidic device, the method comprising:

providing a ~~microfludie~~microfluidic device comprising a body structure with a microscale cavity disposed therein, wherein the microscale cavity comprises a first microchannel comprising at least one reagent flow region and at least one particle capture region, and wherein the at least one particle capture region has an increased depth relative to the at least one reagent flow region;

flowing a set of particles through the microscale cavity to the particle capture region where the set of particles is retained in a fixed position; and

flowing one or more liquid reagents over the retained set of particles so that a chemical reaction occurs within the particle retention region.

13. (withdrawn) The method of claim 12, wherein the chemical reaction comprises a reaction between at least one of the one or more liquid reagents and the particles.

14. (withdrawn) The method of claim 12, wherein the chemical reaction comprises a reaction between at least one of the one or more liquid reagents and reagents coupled to the particles in the set of particles.

15. (withdrawn) The method of claim 14, wherein the chemical reaction comprises nucleic acid hybridization.

16. (withdrawn) The method of claim 14, wherein the chemical reaction comprises DNA amplification.

17. (previously presented) A system for performing a chemical reaction, the system comprising:

a fluid direction system;

a microfluidic device comprising a body structure with a microscale cavity disposed therein, wherein the microscale cavity comprises a first microchannel comprising at least one reagent flow region and at least one particle capture region, wherein the at least one particle capture region has an increased depth relative to the at least one reagent flow region; and

a set of particles disposed within the microscale cavity, wherein the set of particles is flowable.

18. (previously presented) The system of claim 17, wherein the fluid direction system move fluid within the microfluidic device by means of electrokinetic driving forces.

19. (previously presented) The system of claim 17, wherein the fluid direction system move fluid within the microfluidic device by means of pressure driving forces.

20. (previously presented) The system of claim 17, further comprising a control system.